


U.S. Patent No. US 9,448,603 v. Google, LLC

1. Claim Chart

| Claim | Analysis |
|---|--|
| <p>[1.P] A method for transferring power to a receptor mobile device from a donor mobile device having a battery, comprising;</p> | <p>Google, LLC (“Company”) performs and/or induces others to perform a method for transferring power to a receptor mobile device from a donor mobile device having a battery.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, Company provides the Google Pixel series of smartphones such as Pixel 5, Pixel 6, Pixel 7, Pixel 7 Pro, Pixel 8 (used herein as an exemplary “donor mobile device” product), and Pixel 8 Pro. The Google Pixel 8 implements Qi, a standard for wireless power transfer, and comprises Battery Share functionality in which the power is transferred wirelessly from a battery (“battery”) of one Google Pixel phone such as a Google Pixel 8 (“donor mobile device”) to the battery of another device (“receptor mobile device”) including, but not limited to Pixel Buds (used herein as an exemplary “receptor mobile device” product), Pixel 5, Pixel 6, Pixel 6 pro, Pixel 7, Pixel 7 pro, and Pixel 8 pro.</p> <div data-bbox="409 764 1661 1000" style="border: 1px solid red; padding: 10px;"> <p>Charge other devices with Pixel</p> <p>Use Battery Share to wirelessly charge Qi-certified phones or accessories, like Pixel Buds, or your Pixel 5–7 Pro, excluding 6a and 7a. Set your accessory or other phone on the back of your phone to charge.</p> </div> <p>Source: https://support.google.com/pixelphone/answer/10107702?hl=en</p> <div data-bbox="409 1068 789 1175" style="border: 1px solid red; padding: 5px;"> <p>Battery and charging</p> </div> <div data-bbox="945 1089 1680 1409" style="border: 1px solid red; padding: 10px;"> <p>24+ hour battery life⁵</p> <p>Up to 72-hour battery life with Extreme Battery Saver⁵</p> <p>Typical 4575 mAh⁶ (Minimum 4485 mAh)</p> <p>Fast charging⁷ – up to 50% charge in about 30 minutes⁷ – using Google 30W USB-C® Charger with USB-PD 3.0 (PPS) sold separately</p> <div data-bbox="945 1305 1297 1409" style="border: 1px solid red; padding: 5px;"> <p>Fast wireless charging (Qi-certified)⁸</p> <p>Battery Share⁹</p> </div> </div> |

| | |
|--|---|
| | <p>Source: https://store.google.com/us/product/pixel_8_specs?hl=en-US</p>  <p>receptor mobile device</p> <p>donor mobile device</p> <p>Source: https://www.youtube.com/watch?v=ttm2TFjvISg at 3:52 (annotated)</p> <p>Further, to the extent this element is performed at least in part by Defendant's software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Company.</p> |
| <p>[1.1] configuring a donor wireless power transfer mechanism on the donor mobile device using a wireless transmit application;</p> | <p>Company performs and/or induces others to perform a method of configuring a donor wireless power transfer mechanism on the donor mobile device using a wireless transmit application.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, the Google Pixel 8 smartphone includes the Battery Share functionality ("wireless transmit application") that is configured to be activated via the Google Pixel 8 settings user interface.</p> |

Turn on Battery Share

Your phone shows that it's sharing its battery and its current battery level.

You can set your phone's battery level for when Battery Share turns off, from 10% to 50%.

When your phone's battery is below that level, you can't Battery Share.

To turn on Battery Share:

1. Open your phone's Settings app.
2. Tap **Battery** > **Battery Share**.

Source: https://store.google.com/us/product/pixel_8_specs?hl=en-US

Battery and charging

24+ hour battery life⁵

Up to 72-hour battery life with Extreme Battery Saver⁵

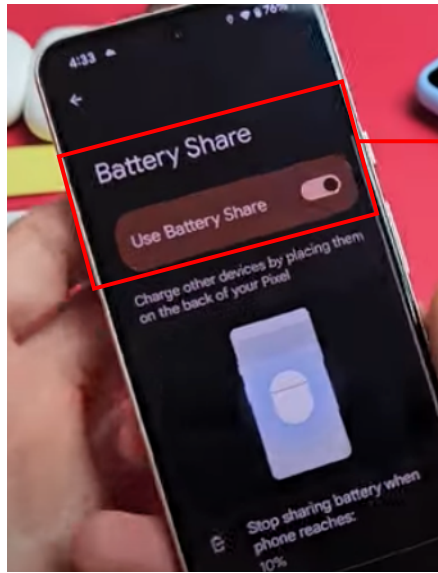
Typical 4575 mAh⁶ (Minimum 4485 mAh)

Fast charging⁷ – up to 50% charge in about 30 minutes⁷ – using Google 30W USB-C® Charger with USB-PD 3.0 (PPS) sold separately

Fast wireless charging (Qi-certified)⁸

Battery Share⁹

Source: https://store.google.com/us/product/pixel_8_specs?hl=en-US



wireless transmit application

Source: <https://www.youtube.com/watch?v=ttm2TFjvISg> at 1:54 (annotated)

How Battery Share works

Important: To charge a device through Battery Share, the device must work with Qi-compliant wireless charging and sit on the right spot on Pixel 5–7 Pro, excluding 6a and 7a. As you line up the device on your phone's back, watch the placement diagram on your phone's screen.

Source: https://store.google.com/us/product/pixel_8_specs?hl=en-US

Further, to the extent this element is performed at least in part by Defendant's software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Company.

[1.2]
configuring a
receptor
wireless
power
transfer
mechanism
on the
receptor
mobile
device using
a wireless
receive
application;

Company performs and/or induces others to perform a method of configuring a receptor wireless power transfer mechanism on the receptor mobile device using a wireless receive application.

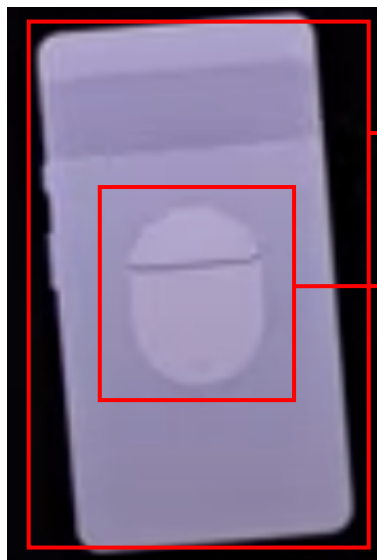
This element is infringed literally, or in the alternative, under the doctrine of equivalents.

For example, the Pixel Buds is placed back-to-back on the Google Pixel 8 smartphone such that the Pixel Buds gets charged. Therefore, it would be apparent that the Pixel Buds comprises a wireless receive application in its firmware that is activated in order for the charging to commence.

Charge other devices with Pixel

Use Battery Share to wirelessly charge Qi-certified phones or accessories, like Pixel Buds, or your Pixel 5–7 Pro, excluding 6a and 7a. Set your accessory or other phone on the back of your phone to charge.

Source: <https://support.google.com/pixelphone/answer/10107702?hl=en>



Google Pixel 8

Pixel Buds

Source: <https://www.youtube.com/watch?v=ttm2TFjvISg> at 0:45 (annotated)

| | |
|--|---|
| | <div data-bbox="405 240 1050 662" data-label="Image"> </div> <div data-bbox="1207 365 1612 441" data-label="Caption"> <p>Pixel Buds placed back to back on Google Pixel 8 for charging.</p> </div> <div data-bbox="411 662 1392 698" data-label="Text"> <p>Source: https://www.youtube.com/watch?v=ttm2TFjvISg at 3:52 (annotated)</p> </div> <div data-bbox="411 735 1869 808" data-label="Text"> <p>Further, to the extent this element is performed at least in part by Defendant's software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Company.</p> </div> |
| <p>[1.3] transferring power from donor mobile device to the receptor mobile device using the donor wireless power transfer mechanism and the receptor wireless power</p> | <p>Company performs and/or induces others to perform a method of transferring power from donor mobile device to the receptor mobile device using the donor wireless power transfer mechanism and the receptor wireless power transfer mechanism.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, the power is transferred from the Pixel 8 phone to the Pixel Buds through Qi wireless power transfer using magnetic induction ("the donor wireless power transfer mechanism and the receptor wireless power transfer mechanism").</p> |

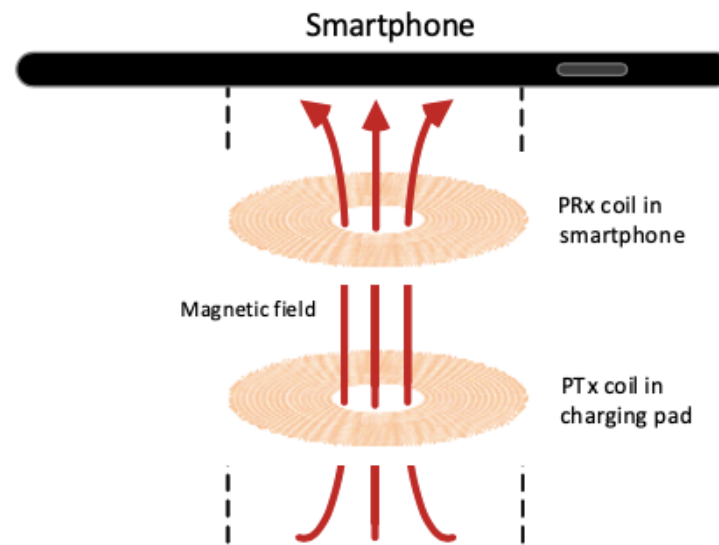
| | |
|--|--|
| transfer mechanism; and | <p>Battery and charging</p> <p>24+ hour battery life⁵</p> <p>Up to 72-hour battery life with Extreme Battery Saver⁵</p> <p>Typical 4575 mAh⁶ (Minimum 4485 mAh)</p> <p>Fast charging⁷ – up to 50% charge in about 30 minutes⁷ – using Google 30W USB-C® Charger with USB-PD 3.0 (PPS) sold separately</p> <p>Fast wireless charging (Qi-certified)⁸</p> <p>Battery Share⁹</p> <p>Source: https://store.google.com/us/product/pixel_8_specs?hl=en-US</p> <p>The Qi wireless power transfer system uses magnetic induction to transfer power from a Power Transmitter Product (charger) to a Power Receiver Product (smartphone).</p> <p>Source: https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-introduction</p> <p>Further, to the extent this element is performed at least in part by Defendant’s software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Company.</p> |
| [1.4] receiving and converting received power into electric current using the receptor wireless power | <p>Company performs and/or induces others to perform a method of receiving and converting received power into electric current using the receptor wireless power transfer mechanism.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, Company uses magnetic induction to transfer power from the power transmitter in the Pixel 8 phone to the power receiver in the Pixel Buds. Further, when charging begins, the magnetic field is picked up by the coil inside Pixel Buds and transformed by a power converter back into a direct electrical current that can be used to charge the Pixel Buds battery.</p> |

| | |
|------------------------|--|
| transfer mechanism; | <h3 data-bbox="426 280 1287 332">3 How Qi wireless power transfer works</h3> <div data-bbox="426 397 804 446"><h4>3.1 Basic concepts</h4></div> <p data-bbox="520 479 1612 548">The Qi wireless power transfer system uses magnetic induction to transfer power from a Power Transmitter Product (charger) to a Power Receiver Product (smartphone).</p> <p data-bbox="411 586 1938 652">Source: https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-introduction, Page 8</p> |
|------------------------|--|

When charging begins, the Power Transmitter runs an alternating electrical current through its coil(s), which generates an alternating magnetic field in accordance with Faraday's law. This magnetic field is in turn picked up by the coil inside the Power Receiver and transformed by a power converter back into a direct electrical current that can be used to charge the battery.

A critical feature of the magnetic field is that it can transfer through any non-metallic, non-ferrous materials, such as plastics, glass, water, wood, and air. In other words, wires and connectors are not needed between the Power Transmitter Product and Power Receiver Product.

Figure 6. Qi wireless power transfer using magnetic induction



Source: <https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-introduction>, Page 9

Further, to the extent this element is performed at least in part by Defendant's software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Company.

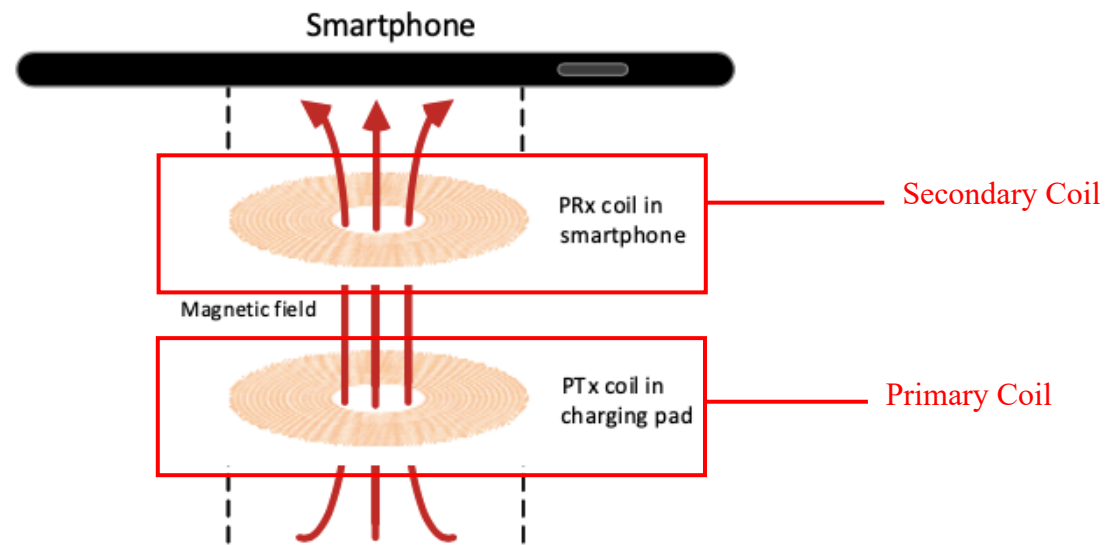
| | |
|---|--|
| <p>[1.5] wherein the donor wireless power transfer mechanism includes a primary coil and donor circuit elements and the receptor wireless power transfer mechanism includes a secondary coil, receptor circuit elements and a capacitor such that the donor circuit elements provide electric current to the primary coil producing a magnetic field that</p> | <p>Company performs and/or induces others to perform a method of transferring power, wherein the donor wireless power transfer mechanism includes a primary coil and donor circuit elements and the receptor wireless power transfer mechanism includes a secondary coil, receptor circuit elements and a capacitor such that the donor circuit elements provide electric current to the primary coil producing a magnetic field that generates an electric current in the secondary coil and the receptor circuit elements thereby transferring power from donor mobile device to the receptor mobile device, the capacitor storing electric charge that increases battery life when the capacitor is discharged.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, when charging begins, the power transmitter in Pixel 8 phone runs an alternating electrical current through its coil (“primary coil”), which generates an alternating magnetic field. This magnetic field is in turn picked up by the coil (“secondary coil”) inside the power receiver in the Pixel Buds and transformed by a power converter back into a direct electrical current that can be used to charge the Pixel Buds battery.</p> <p>Further, the power receiver circuitry in Pixel Buds comprises a secondary coil and a capacitor such that the battery gets charged. Further, the power receiver in Pixel Buds sends a signal to the power transmitter in the Pixel 8 phone when wireless power is not required. It would be apparent to a person having ordinary skill in the art that the capacitor in the Pixel Buds circuitry is used for storing an electric charge which further increases the battery life.</p> |
|---|--|

generates an electric current in the secondary coil and the receptor circuit elements thereby transferring power from donor mobile device to the receptor mobile device, the capacitor storing electric charge that increases battery life when the capacitor is discharged.

When charging begins, the Power Transmitter runs an alternating electrical current through its coil(s), which generates an alternating magnetic field in accordance with Faraday's law. This magnetic field is in turn picked up by the coil inside the Power Receiver and transformed by a power converter back into a direct electrical current that can be used to charge the battery.

A critical feature of the magnetic field is that it can transfer through any non-metallic, non-ferrous materials, such as plastics, glass, water, wood, and air. In other words, wires and connectors are not needed between the Power Transmitter Product and Power Receiver Product.

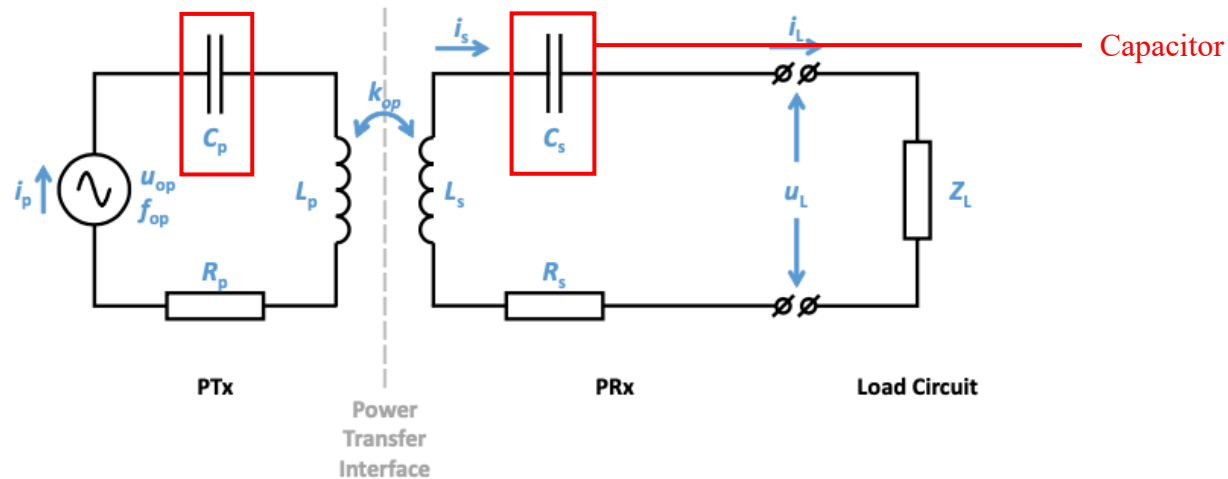
Figure 6. Qi wireless power transfer using magnetic induction



Source: <https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-introduction>, Page 9

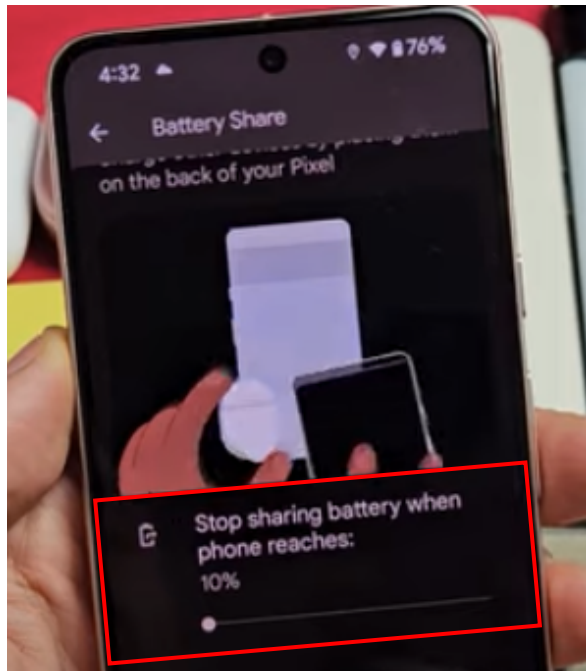
Figure 11 illustrates a simplified model of the system comprising a Power Transmitter on the left and a Power Receiver on the right. For clarity, the load circuit is drawn separately from the Power Receiver. The Power Transmitter consists of a power source (u_{op}, f_{op}), a capacitance C_p , an inductance L_p , and a resistance R_p . The power source supplies a sinusoidal voltage u_{op} at a frequency f_{op} . The Power Receiver consists of a capacitance C_s , an inductance L_s , and a resistance R_s . A load having an impedance Z_L is connected to the output terminals of the Power Receiver. The symbols u_L , i_L , i_p , and k_{op} represent the load voltage, load current, Primary Coil current, and coupling factor.

Figure 11. Simplified system model



Source: https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-Power_Delivery, Page 33

| | |
|---|---|
| | <p>It is recommended that the Power Transmitter Product's power consumption in stand-by mode of operation meets the Energy Star EPS Requirements for "Energy consumption for No-Load" and the European Commission, Code of Conduct of Energy Efficiency of External Power Supplies for "No-load power consumption." It is also recommended that a Power Receiver is designed in a manner that when wireless power is not required, the Power Receiver will send an End Power Transfer Packet to put the Power Transmitter Product in stand-by mode.</p> <p>Source: https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-Power_Delivery, Page 45</p> <p>Further, to the extent this element is performed at least in part by Defendant's software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Company.</p> |
| <p>[2] The method of claim 1, further comprising configuring a donor power threshold using a wireless transmit application.</p> | <p>Company performs and induces others to perform the method of comprising configuring a donor power threshold using a wireless transmit application.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, the Battery Share feature comprises a battery limit ("donor power threshold") option in which the Pixel 8 phone can share power with the Pixel Buds up to a certain limit. This prevents the Pixel Buds from completely discharging the Pixel 8 phone.</p> |



Source: <https://www.youtube.com/watch?v=ttm2TFjvISg> at 0:48

Turn on Battery Share

Your phone shows that it's sharing its battery and its current battery level.

You can set your phone's battery level for when Battery Share turns off, from 10% to 50%. When your phone's battery is below that level, you can't Battery Share.

Source: <https://support.google.com/pixelphone/answer/10107702?hl=en>

Further, to the extent this element is performed at least in part by Defendant's software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Company.

| | |
|---|---|
| <p>[3] The method of claim 2, further comprising determining whether the donor mobile device has been reduced to the donor power threshold.</p> | <p>Company performs and induces others to perform the method of comprising determining whether the donor mobile device has been reduced to the donor power threshold.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, the wireless power sharing between two devices discontinues if battery percentage of the transmitting device reaches its battery limit (“donor power threshold”) set by the user. Therefore, while sharing power with the receiving device, the transmitting device’s battery reduces simultaneously.</p> <h3>Turn on Battery Share</h3> <p>Your phone shows that it’s sharing its battery and its current battery level.</p> <div style="border: 1px solid red; padding: 5px;"> <p>You can set your phone’s battery level for when Battery Share turns off, from 10% to 50%. When your phone's battery is below that level, you can't Battery Share.</p> </div> <p>Source: https://support.google.com/pixelphone/answer/10107702?hl=en</p> <p>Further, to the extent this element is performed at least in part by Defendant’s software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Company.</p> |
| <p>[4] The method of claim 1, further comprising configuring a receptor power threshold using a wireless receive application.</p> | <p>Company performs and induces others to perform the method of claim 1, further configuring a receptor power threshold using a wireless receive application.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, the Pixel Buds includes an output disconnect switch, which gets activated when the power receiver reaches a certain maximum threshold. Furthermore, the Pixel Buds are designed in a manner that when wireless power is not required, the Pixel Buds will send an End Power Transfer Packet to put the power transmitter functionality in the Pixel 8 phone in standby mode. Therefore, it would be apparent to a person having ordinary skill in the art that the Pixel Buds gets charged until the battery of the Pixel Buds reaches a specific power threshold.</p> |

- An output disconnect switch, which prevents current from flowing to the output when the Power Receiver does not provide power at its output. In addition, the output disconnect switch prevents current back flow into the Power Receiver when the Power Receiver does not provide power at its output. Moreover, the output disconnect switch minimizes the power that the Power Receiver draws from the Power Transmitter when a Power Signal is first applied to the Secondary Coil.

Source: https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-Power_Delivery, Page 13


The Power Receiver shall have the means to disconnect its output from the subsystems connected thereto. If the Power Receiver has disconnected its output, it shall ensure that it still draws a sufficient amount of power from the Power Transmitter, such that Power Receiver to Power Transmitter communications remain possible (see *Qi Specification, Communications Physical Layer*).

The Power Receiver shall keep its output disconnected until it reaches the *power transfer* phase for the first time after a Digital Ping (see the *Qi Specification, Communications Protocol*). Subsequently, the Power Receiver may operate the output disconnect switch any time while the Power Transmitter applies a Power Signal.

NOTE: The Power Receiver may experience a voltage peak when operating the output disconnect switch (and changing between maximum and near-zero power dissipation).

Source: https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-Power_Delivery, Page 17

| | |
|---|--|
| | <p>It is recommended that the Power Transmitter Product's power consumption in stand-by mode of operation meets the Energy Star EPS Requirements for "Energy consumption for No-Load" and the European Commission, Code of Conduct of Energy Efficiency of External Power Supplies for "No-load power consumption." It is also recommended that a Power Receiver is designed in a manner that when wireless power is not required, the Power Receiver will send an End Power Transfer Packet to put the Power Transmitter Product in stand-by mode.</p> <p>Source: https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-Power_Delivery, Page 45</p> |
| <p>[8-P] A method for transferring power to a receptor mobile device from a donor mobile device having a battery, comprising;</p> | <p>Alphabet ("Company") performs and induces others to perform a method for transferring power to a receptor mobile device having a first battery from a donor mobile device having a second battery.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, Company provides the Google Pixel series of smartphones such as Pixel 5, Pixel 6, Pixel 7, Pixel 7 Pro, Pixel 8 (used herein as an exemplary "donor mobile device" product), and Pixel 8 Pro. The Google Pixel 8 implements Qi, a standard for wireless power transfer, and comprises Battery Share functionality in which the power is transferred wirelessly from a battery ("battery") of one Google Pixel phone such as a Google Pixel 8 ("donor mobile device") to the battery of another device ("receptor mobile device") including, but not limited to Pixel Buds (used herein as an exemplary "receptor mobile device" product), Pixel 5, Pixel 6, Pixel 6 pro, Pixel 7, Pixel 7 pro, and Pixel 8 pro.</p> <div style="border: 2px solid red; padding: 10px; margin: 10px 0;"> <h2 style="text-align: center;">Charge other devices with Pixel</h2> <p style="text-align: center;">Use Battery Share to wirelessly charge Qi-certified phones or accessories, like Pixel Buds, or your Pixel 5–7 Pro, excluding 6a and 7a. Set your accessory or other phone on the back of your phone to charge.</p> </div> <p>Source: https://support.google.com/pixelphone/answer/10107702?hl=en</p> |

| | |
|---|---|
| | <p>Battery and charging</p> <p>24+ hour battery life⁵</p> <p>Up to 72-hour battery life with Extreme Battery Saver⁵</p> <p>Typical 4575 mAh⁶ (Minimum 4485 mAh)</p> <p>Fast charging⁷ – up to 50% charge in about 30 minutes⁷ – using Google 30W USB-C® Charger with USB-PD 3.0 (PPS) sold separately</p> <p>Fast wireless charging (Qi-certified)⁸</p> <p>Battery Share⁹</p> <p>Source: https://store.google.com/us/product/pixel_8_specs?hl=en-US</p>  <p>Source: https://www.youtube.com/watch?v=ttm2TFjvISg at 3:52 (annotated)</p> <p>Further, to the extent this element is performed at least in part by Defendant’s software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Company.</p> |
| <p>[8.1] configuring a wireless power transfer mechanism on the</p> | <p>Company performs and induces others to perform the method of configuring a wireless power transfer mechanism on the receptor mobile device using a wireless receive application.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> |

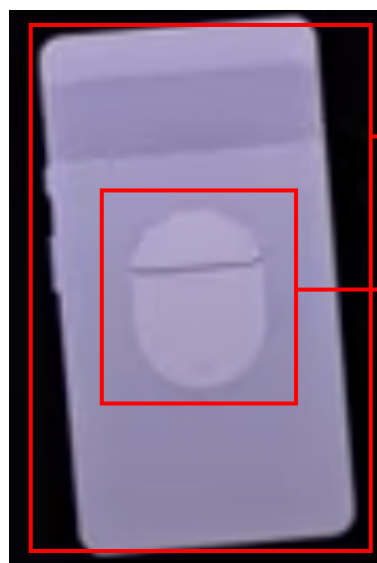
receptor
mobile
device using
a wireless
receive
application;

For example, the Pixel Buds is placed back-to-back on the Google Pixel 8 smartphone such that the Pixel Buds gets charged. Therefore, it would be apparent that the Pixel Buds comprises a wireless receive application in its firmware that is activated in order for the charging to commence.

Charge other devices with Pixel

Use Battery Share to wirelessly charge Qi-certified phones or accessories, like Pixel Buds, or your Pixel 5–7 Pro, excluding 6a and 7a. Set your accessory or other phone on the back of your phone to charge.

Source: <https://support.google.com/pixelphone/answer/10107702?hl=en>



Google Pixel 8

Pixel Buds

Source: <https://www.youtube.com/watch?v=ttm2TFjvISg> at 0:45 (annotated)

| | |
|--|--|
| | <div data-bbox="405 240 1050 625" data-label="Image"> </div> <p data-bbox="1207 332 1612 402">Pixel Buds placed back-to-back on Google Pixel 8 for charging.</p> <p data-bbox="409 625 1390 657">Source: https://www.youtube.com/watch?v=ttm2TFjvISg at 3:52 (annotated)</p> <p data-bbox="409 690 1934 755">Further, to the extent this element is performed at least in part by Defendant's software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Company.</p> |
| <p data-bbox="199 766 388 1091">[8.2] determining a receptor power threshold using wireless receive application;</p> | <p data-bbox="409 792 1934 863">Company performs and induces others to perform the method of determining a receptor power threshold using a wireless receive application.</p> <p data-bbox="409 893 1543 925">This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p data-bbox="367 954 1934 1140">a For example, the Pixel Buds includes an output disconnect switch, which gets activated when the power receiver reaches a certain maximum threshold. Furthermore, the Pixel Buds are designed in a manner that when wireless power is not required, the Pixel Buds will send an End Power Transfer Packet to put the power transmitter functionality in the Pixel 8 phone in standby mode. Therefore, it would be apparent to a person having ordinary skill in the art that the Pixel Buds gets charged until the battery of the Pixel Buds reaches a specific power threshold.</p> <p data-bbox="409 1177 1768 1263"><u>The Qi wireless power transfer system uses magnetic induction</u> to transfer power from a Power Transmitter Product (charger) to a Power Receiver Product (smartphone).</p> <p data-bbox="409 1312 1934 1383">Source: https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-introduction , Page 8</p> |

- An output disconnect switch, which prevents current from flowing to the output when the Power Receiver does not provide power at its output. In addition, the output disconnect switch prevents current back flow into the Power Receiver when the Power Receiver does not provide power at its output. Moreover, the output disconnect switch minimizes the power that the Power Receiver draws from the Power Transmitter when a Power Signal is first applied to the Secondary Coil.

Source: https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-Power_Delivery, Page 13

The Power Receiver shall have the means to disconnect its output from the subsystems connected thereto. If the Power Receiver has disconnected its output, it shall ensure that it still draws a sufficient amount of power from the Power Transmitter, such that Power Receiver to Power Transmitter communications remain possible (see *Qi Specification, Communications Physical Layer*).

The Power Receiver shall keep its output disconnected until it reaches the *power transfer* phase for the first time after a Digital Ping (see the *Qi Specification, Communications Protocol*). Subsequently, the Power Receiver may operate the output disconnect switch any time while the Power Transmitter applies a Power Signal.

NOTE: The Power Receiver may experience a voltage peak when operating the output disconnect switch (and changing between maximum and near-zero power dissipation).

Source: https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-Power_Delivery, Page 45

| | |
|--|---|
| | <p>It is recommended that the Power Transmitter Product's power consumption in stand-by mode of operation meets the Energy Star EPS Requirements for "Energy consumption for No-Load" and the European Commission, Code of Conduct of Energy Efficiency of External Power Supplies for "No-load power consumption." It is also recommended that a Power Receiver is designed in a manner that when wireless power is not required, the Power Receiver will send an End Power Transfer Packet to put the Power Transmitter Product in stand-by mode.</p> <p>Source: https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-Power_Delivery, Page 45</p> <p>Further, to the extent this element is performed at least in part by Defendant's software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Company.</p> |
| <p>[8.3] receiving power from the donor mobile device and converting received power into electric current using the wireless power transfer mechanism;</p> | <p>Company performs and induces others to perform the method of receiving power from the donor mobile device and converting received power into electric current using the wireless power transfer mechanism.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, Company uses magnetic induction to transfer power from the power transmitter in the Pixel 8 phone to the power receiver in Pixel Buds. Further, when charging begins, the magnetic field is picked up by the coil inside Pixel Buds and transformed by a power converter back into a direct electrical current that can be used to charge the Pixel Buds battery.</p> |

3 How Qi wireless power transfer works

3.1 Basic concepts

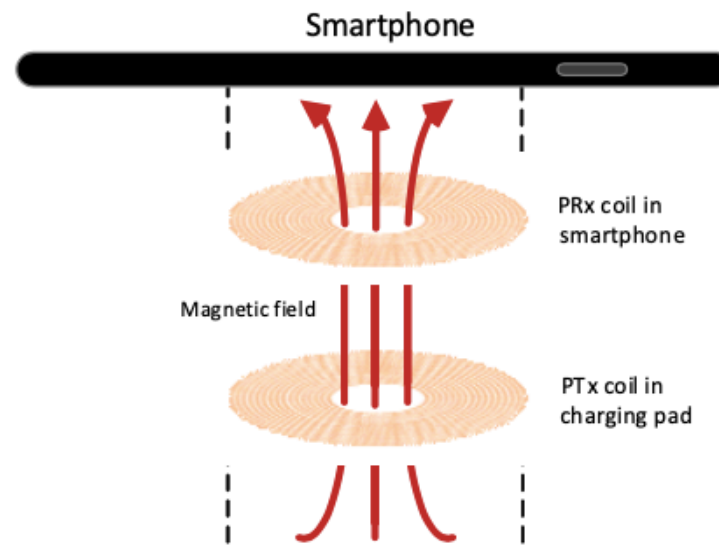
The Qi wireless power transfer system uses magnetic induction to transfer power from a Power Transmitter Product (charger) to a Power Receiver Product (smartphone).

Source: <https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-introduction>, Page 8

When charging begins, the Power Transmitter runs an alternating electrical current through its coil(s), which generates an alternating magnetic field in accordance with Faraday's law. This magnetic field is in turn picked up by the coil inside the Power Receiver and transformed by a power converter back into a direct electrical current that can be used to charge the battery.

A critical feature of the magnetic field is that it can transfer through any non-metallic, non-ferrous materials, such as plastics, glass, water, wood, and air. In other words, wires and connectors are not needed between the Power Transmitter Product and Power Receiver Product.

Figure 6. Qi wireless power transfer using magnetic induction



Source: <https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-introduction>, Page 9

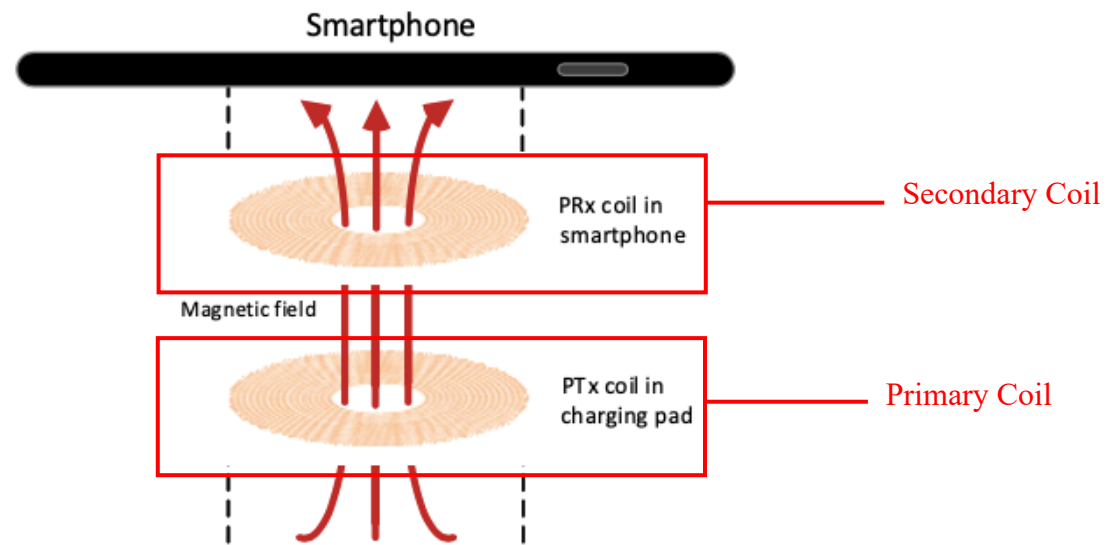
Further, to the extent this element is performed at least in part by Defendant's software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Company.

| | |
|--|--|
| <p>[8.4] wherein the wireless power transfer mechanism includes a power adapter having coil, circuit elements to transfer power and a capacitor to store electric charge that increases battery life when the capacitor is discharged.</p> | <p>Company performs and induces others to perform the method wherein the wireless power transfer mechanism includes a power adapter having coil, circuit elements to transfer power and a capacitor to store electric charge that increases battery life when the capacitor is discharged.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, when charging begins, the power transmitter in Pixel 8 phone runs an alternating electrical current through its coil (“primary coil”), which generates an alternating magnetic field. This magnetic field is in turn picked up by the coil (“secondary coil”) inside the power receiver in the Pixel Buds and transformed by a power converter back into a direct electrical current that can be used to charge the Pixel Buds battery.</p> <p>Further, the power receiver circuitry in Pixel Buds comprises a secondary coil and a capacitor such that the battery gets charged. Further, the power receiver in Pixel Buds sends a signal to the power transmitter in the Pixel 8 phone when wireless power is not required. It would be apparent to a person having ordinary skill in the art that the capacitor in the Pixel Buds circuitry is used for storing an electric charge which further increases the battery life.</p> |
|--|--|

When charging begins, the Power Transmitter runs an alternating electrical current through its coil(s), which generates an alternating magnetic field in accordance with Faraday's law. This magnetic field is in turn picked up by the coil inside the Power Receiver and transformed by a power converter back into a direct electrical current that can be used to charge the battery.

A critical feature of the magnetic field is that it can transfer through any non-metallic, non-ferrous materials, such as plastics, glass, water, wood, and air. In other words, wires and connectors are not needed between the Power Transmitter Product and Power Receiver Product.

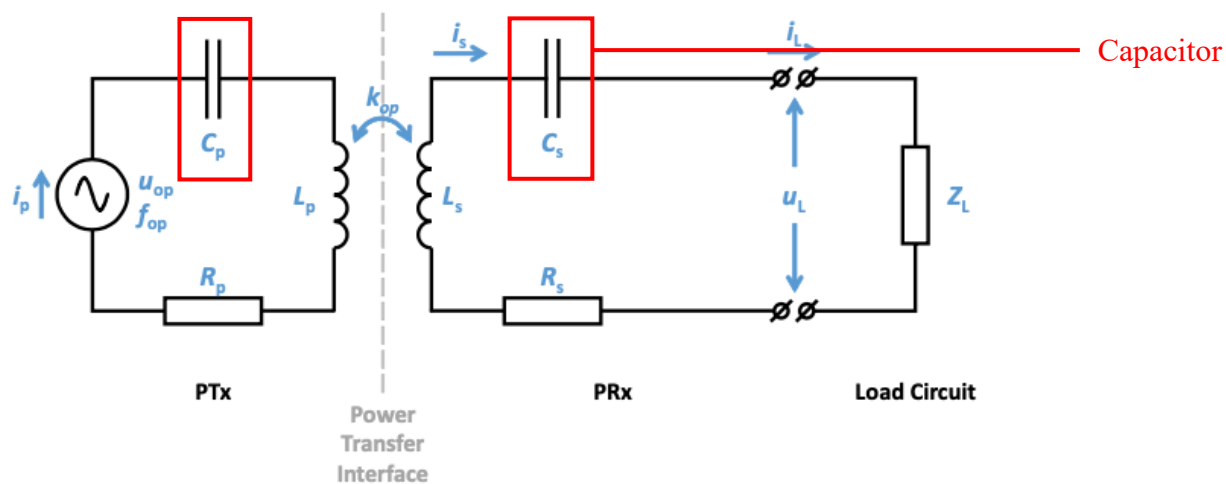
Figure 6. Qi wireless power transfer using magnetic induction



Source: <https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-introduction>, Page 9

Figure 11 illustrates a simplified model of the system comprising a Power Transmitter on the left and a Power Receiver on the right. For clarity, the load circuit is drawn separately from the Power Receiver. The Power Transmitter consists of a power source (u_{op}, f_{op}), a capacitance C_p , an inductance L_p , and a resistance R_p . The power source supplies a sinusoidal voltage u_{op} at a frequency f_{op} . The Power Receiver consists of a capacitance C_s , an inductance L_s , and a resistance R_s . A load having an impedance Z_L is connected to the output terminals of the Power Receiver. The symbols u_L , i_L , i_p , and k_{op} represent the load voltage, load current, Primary Coil current, and coupling factor.

Figure 11. Simplified system model



Source: https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-Power_Delivery, Page 33

It is recommended that the Power Transmitter Product's power consumption in stand-by mode of operation meets the Energy Star EPS Requirements for "Energy consumption for No-Load" and the European Commission, Code of Conduct of Energy Efficiency of External Power Supplies for "No-load power consumption." It is also recommended that a Power Receiver is designed in a manner that when wireless power is not required, the Power Receiver will send an End Power Transfer Packet to put the Power Transmitter Product in stand-by mode.

Source: https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/V-1.3-Power_Delivery, Page 45

Further, to the extent this element is performed at least in part by Defendant's software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Company.

2. List of References

1. <https://support.google.com/pixelphone/answer/10107702?hl=en>, last accessed on 13 March, 2023.
2. https://store.google.com/us/product/pixel_8_specs?hl=en-US, last accessed on 13 March, 2023.
3. <https://www.youtube.com/watch?v=ttm2TFjvISg>, last accessed on 13 March, 2023.
4. <https://www.wirelesspowerconsortium.com/knowledge-base/specifications/download-the-qi-specifications/> , last accessed on 13 March, 2023